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ABSTRACT

Engineering students can use a humanistic research project on the poetry of Walt Whitman as the basis for a technical report. Students must first become familiar with the scientific method so that they will have a general procedure for gathering and analyzing data for the project. To use the scientific method, students isolate the problem, observe evidence in order to form a hypothesis, devise an experiment or project that will allow them to collect objective data, and formulate a theory to account for the data gathered. After students understand how to use the scientific method, they must learn the general format for scientific or technical reports. In the Whitman project, students tabulate and analyze data on the vocabulary he uses in "Leaves of Grass," and then write a short technical report that presents the results of their analysis. The project demonstrates the possibility of meaningful interaction between the sciences and humanities. (Additional assignments and exercises are included throughout the text.) (MM)

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HUMANISTIC RESEARCH PROJECTS: THE BASIS FOR A TECHNICAL REPORT

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Engineering students can use certain humanistic research projects as a basis for writing a technical report. Such an assignment works especially well in college composition classes, which most engineering students must take, and in beginning technical writing classes, which many engineering students are required to take or elect to take. All that is needed is a bit of flexibility on the part of students and faculty.

For example, I have students analyze the vocabulary in a section of Walt Whitman's poetry and then present the results of the research as a technical report. By completing this assignment, students

1. learn the proper procedure for gathering and analyzing data for a research project (the scientific method),
2. learn the format of a technical report, including matters such as the usual major sections and expected content, and the use of headings and support graphics,
3. learn to use the Oxford English Dictionary and the Dictionary of Americanisms, and
4. learn about Whitman's vocabulary in Leaves of Grass.

Thus, students learn about matters of practical value to those in engineering (#1 and #2 above) and about matters considered to be in the realm of the humanities (#3 and #4).

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I have organized this paper into three major sections: the scientific method, a general format for a technical report, and a humanistic research project. Each section ends with a sub-section called "Supplemental Work." In these sub-sections, I indicate additional material instructors can cover and additional exercises they can choose to do according to their own interests and training, the type of course in which they use the project, and the amount of time that they have to spend on the project.

THE SCIENTIFIC METHOD

When I have students analyze Walt Whitman's vocabulary, I begin by explaining the scientific method so that they will have a general procedure for gathering and analyzing data for this research project. (Engineering students especially need to learn such a procedure early in their academic studies.)

To use the scientific method, students first isolate the problem they will study and attempt to solve; they define the problem. Then they observe the evidence in order to form a hypothesis. At that point, they devise an experiment or project that will allow them to collect objective data that will verify, disprove, or modify their hypothesis. After studying the collected data, they formulate a theory that accounts for the data gathered.

For the assignment I'm describing, the students focus on the last two parts of the scientific method, gathering data and interpreting it. The instructor is the one who is defining

the problem. The instructor tells the students what to study and what data to gather. The students then determine some of the characteristics of Whitman's vocabulary. Students as researchers need to learn to use the inductive approach as part of their research method. They must learn to gather the specific data, analyze the data, and reach general conclusions.

Supplemental Work

- Students can read and discuss writings from science, engineering, and technology that illustrate the scientific method.[1]
- The instructor can explain the mechanics of gathering data: for example, how to do library research in which students use note cards to record both bibliographical data and other information gathered methodically and accurately.

A GENERAL FORMAT FOR A TECHNICAL REPORT

After my students understand how to use the scientific method in a research project, I then discuss the following general format that they can use for many of the scientific/technical reports that they will write.

Title

Introduction

subject and purpose
scope
overview

Literature Review

Background

Materials and Equipment

Methods/Procedures

Results

Conclusions

Recommendations

References

Appendices

Supplemental Work

- When explaining the section called "Literature Review," the instructor can discuss using reference works and secondary sources as well as primary sources, paraphrasing and quoting from other sources, preparing annotated bibliographies, and basing new research on earlier research by others. For the assignment I'm describing, students can read secondary sources about Whitman's poetry.

- When discussing the types of information researchers put in the "Background" section, the instructor can provide information about matters such as Whitman's life or Whitman's theory of words and language in class lectures, or have the students read secondary sources.

- When learning about the "Results' section, students can learn about support graphics. The instructor can teach students how to use tables and figures to supplement prose and to replace prose that contains a multitude of facts and details. Also the instructor can explain how to construct tables and figures properly. Since I have the students prepare their reports about Whitman's vocabulary for a lay audience, the students need to know about bar graphs, pie charts, and other simple types of support graphics.

- When describing the "References" section, the instructor

can explain some of the different methods of documentation used in various fields in the humanities and sciences. The instructor can also briefly describe style manuals.

A HUMANISTIC RESEARCH PROJECT

After students learn about the scientific method and about a format to use to present the results they obtain by applying the scientific method, I assign them a research project in which they analyze some of the vocabulary Walt Whitman uses in his Leaves of Grass. I give them the following information:

Subject/Purpose/Scope

Analyze the vocabulary that Walt Whitman uses in a poem or a passage from a poem in Leaves of Grass.

Materials

Leaves of Grass, Blodgett and Bradley's Comprehensive Reader's Edition (1892)

Oxford English Dictionary (OED)

A Dictionary of Americanisms on Historical Principles, Mitford M. Mathews (DA)

Procedures

Select a passage from Leaves of Grass.

Choose the vocabulary to be analyzed:

- Use "content" words.
- Omit "function" words such as articles, prepositions, and conjunctions.

Record information taken from the OED:

- Language origin
- Earliest date of written use
- Special information such as status labels and subject labels

Record information given in DA.

After the students tabulate and analyze the data they have

collected, they write a short technical report that presents the results of their analysis. In this report, they must use appropriate headings and support graphics. Since the paper is to be two to four pages in length or 500-1,000 words, I have them use an abbreviated version of the general format that I gave earlier in this paper.

Title

Introduction

> What are you investigating? How have you limited your research? What are the major sections of your report?

Procedures

> What are your sources of data and how did you obtain your data? Can the reader redo what you did exactly the way you did it?

Results

> What data did you obtain? What did you find when you analyzed your data? [Illustrate with details and examples. Use support graphics.]

Conclusions

> What conclusions can you draw from your data? [Summarize your results.]

Appendices

> [Place your support graphics here. Refer to them at the appropriate places in the results section.]

Whitman's diction is particularly good for this assignment because of the diversity of the language that he uses.[2] He includes words from

> all stages of language (neologisms, obsolete terms, adaptations from foreign terms that were becoming Americanized and other Americanisms, current terms),
>
> all languages (Greek and Latin, German, Spanish, Italian,

French, English),

all levels of languages (learned, slang, colloquial, poetical, technical), and

all subject areas (all professions and fields including sciences such as astronomy and phrenology, music, and trade and manufacturing).

In addition, it was important to him to use words that described and expressed America and Americans, especially the American working class and the average, common American.

Supplemental Work

- The instructor can define definitive editions, describing in particular Blodgett and Bradley's definitive edition of Leaves of Grass. The instructor can also explain the several editions of Leaves of Grass in which Whitman revised and expanded his book of poetry.

- If resources are limited, the students can use an unabridged dictionary or a standard collegiate dictionary, rather than the OED or DA.

- The instructor can discuss special types of dictionaries such as usage dictionaries, thesauruses, and dictionaries of technical terms.

- The instructor can teach students how to use a dictionary and discuss the information that a dictionary entry contains.

- The instructor can lecture about defining as a rhetorical technique in writing.

- Students can give short oral reports in which they present the results of their research. Or they can spend one class period informally discussing Whitman's vocabulary in the passage that they analyzed.

CONCLUSION

Walt Whitman wrote in one of his poems, "I am large, I contain multitudes."[3] Similarly, we in the humanities and in engineering can contain multitudes. We do not have to and should not limit ourselves to only our own areas. There can be meaningful interaction. The poetry of Walt Whitman from the realm of the humanities can serve to teach engineering students how to gather data using the scientific method and then how to present that data using a technical report format.

REFERENCES

1. For example, Robert Lynch and Thomas Swanzey in The Example of Science: An Anthology for College Composition divide the scientific method into five steps and provide readings to illustrate each step.
2. Although almost any passage from Whitman's Leaves of Grass is suitable for this project, the following poems or sections from poems work especially well if you want the students to find examples of Whitman's use of both general and specific technical terms: Section 31, "Song of Myself" [geology]; Lines 129-164, Section 9 "I Sin Body Electric" [anatomy]; Lines 103-121, "A Song For Occup s," [professions]; Lines 186-217, "Song of the Broad-Axe" [carpentry]; Selections from poems in the "Drum-Taps" collection [military and war terms]; and Selections from poems in the "Sea-Drift" collection [nautical terms and ones related to the sea]. Throughout his poetry, Whitman uses terms to describe the flora and the fauna of America. His

diction also includes words used in astronomy, mathematics, and music. Other poems and passages are better for illustrating the wide range of his vocabulary.

3. Walt Whitman, "Song of Myself," Leaves of Grass: Comprehensive Reader's Edition, eds. Harold W. Blodgett and Sculley Bradley (New York: New York University Press, 1965), p. 88.